**1**. Kinds of energy

A. List three ways potential energy is like having studied for an exam?.

*1. They both involve an action that may occur but is not presently occurring.*

*2. Converting potential energy to kinetic energy may require a “push” as when someone pushes a ball to start it rolling down hill. Similarly, some people need a push to turn their thoughts into actions.*

*3. Potential energy is abstract. You cannot feel it, weigh it, or hear it just like people’s thoughts*

B. List three ways they are different

*1. Potential energy indicates actions that can actually occur while thinking about something may involve actions that are actually impossible.*

*2. Potential energy implies a direction to movement or change. For example, balls roll down hill not uphill. People’s thoughts are not as restricted. People can think about doing anything.*

*3. We can measure the amount of potential energy in a system but we cannot measure people’s thoughts.*

**2.** Gravitational potential energy is like chemical potential energy. (Other combinations are possible involving thermal potential energy).

A. List three ways gravitational potential energy is similar to chemical potential energy.

*1. Both can be can be converted into kinetic energy as evidenced by a change in position. Gravitational potential energy can cause things to move from higher elevation to lower and chemical potential energy can cause atoms to rearrange into different molecules.*

*2. Both can be converted into other forms of energy such as thermal energy.*

*3. Both can be used to generate electricity. For example, gravitational potential energy of a stream can be converted into kinetic energy of turbines that generate electricity while chemical potential of coal can be converted in thermal energy that turns turbines and generates electricity. (Note: students may provide an answer like this without understanding electromagnetism- the instructor might explain this with yet another analogy- a rotating magnet “pumps” electrons through a coil like a water pump pumps water through a pipe.*

BV. List three ways gravitational potential and chemical potential are different.

*1.Elevation effects gravitational potential energy but it does not effect chemical potential energy.*

*2. Gravitational potential energy can be effected by the mass of objects. Mass does not effect the chemical potential of substances.*

*3. Chemical potential is effected by temperature, gravitational potential is not.*

**3**. One similarity between chemical potential energy and gravitational potential energy is that they are both measurable quantities. Devise an experiment by which you could measure and compare the amount of chemical potential energy in a pound of coal and a pound of oil.